PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 33527-WO-U	**FOR FURTHER ACTION**	See Form PCT/IPEA/416
International application No. PCT/BE2005/000013	International filing date *(day/month/year)* 02.02.2005	Priority date *(day/month/year)* 03.02.2004
International Patent Classification (IPC) or national classification and IPC INV. F16C33/58 F16C27/04 F16C27/06		
Applicant HANSEN TRANSMISSIONS INTERNATIONAL N.V.et al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 3 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the report
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
28.07.2005	09.05.2006
Name and mailing address of the international preliminary examining authority: European Patent Office - Gitschiner Str. 103 D-10958 Berlin Tel. +49 30 25901 - 0 Fax: +49 30 25901 - 840	Authorized officer Axelsson, T Telephone No. +49 30 25901-522

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/BE2005/000013

Box No. I Basis of the report

1. With regard to the **language**, this report is based on

   ☒ the international application in the language in which it was filed

   ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3(a) and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4(a))
   - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-7	as originally filed

Claims, Numbers

1-13	received on 01.08.2005 with letter of 27.07.2005

Drawings, Sheets

1/1	as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-13
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-13
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-13
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (SEPARATE SHEET)

International application No.
PCT/BE2005/000013

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Reference is made to the following document:

D1: US 2003/210843 A1 (KOTZALAS MICHAEL N ET AL) 13 November 2003 (2003-11-13)

The document D1 is regarded as being the closest prior art to the subject-matter of claim 1, and shows (the references in parentheses applying to this document):

> a roller bearing comprising a plurality of bearing rollers (3) located between confronting surfaces (5,10), said bearing surfaces (5,10) being rotatable one relative to the other about the rotational axis of the bearing, and said bearing comprising biasing means (14,15) which provides a force acting in a direction between said confronting bearing surfaces (5,10), whereby said biasing force is provided by deformability of at least one of the confronting bearing surfaces (5,10), wherein an edge region of a bearing surface of at least one of said confronting bearing surfaces, when in an unstressed condition, comprises a zone which protrudes above the adjacent surface region of said bearing surface (see, fig.4), wherein the bearing surfaces, when in a preloaded condition, have cylindrical or crowned shape, and wherein the preloaded bearing exerts a biasing force in such a way that under all load conditions for which the bearing is designed for use, each bearing roller is retained in contact with each of said confronting bearing surfaces.

The subject-matter of claim 1 differs from this known roller bearing in that said edge region, in the assembled bearing, exerts the aforementioned biasing force.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as to provide a preloaded bearing having a simple design and low manufacturing costs.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:

Due to the design wherein the biasing force is exerted by protruding edge regions on the bearing or roller surface, no support ring is needed, nor a groove in the bearing rings has to be provided. Hence, a more simple design and lower manufacturing costs can be achieved.

Claims 2-13 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

Re Item VIII
Certain observations on the international application

Contrary to the requirements of Rule 5.1(a)(ii) PCT, the relevant background art disclosed in the document D1 is not mentioned in the description, nor is this document identified therein.

Independent claim 1 is not in the correct two-part form in accordance with Rule 6.3(b) PCT, which in the present case would be appropriate, with those features known in combination from the prior art (document D1) being placed in the preamble (Rule 6.3(b)(I) PCT) and with the remaining features being included in the characterising part (Rule 6.3(b)(ii) PCT).

The description is not in conformity with the amended claims as required by Rule 5.1(a)(iii) PCT.

Claims

1.- A roller bearing (10) comprising a plurality of bearing rollers (12) located between confronting surfaces (16,19), said bearing surfaces being rotatable one relative to the other about the rotational axis of the bearing, and said bearing comprising biasing means (18) which provides a force acting in a direction between said confronting bearing surfaces (16,19), whereby said biasing force is provided by deformability of at least one of the confronting bearing surfaces (16,19) or by deformability of the or each roller (20), characterised in that an edge region of a bearing surface of at least one of said confronting bearing surfaces or a bearing surface of a roller, when in an unstressed condition, comprises a zone (15,23) which protrudes above the adjacent surface region of said bearing surface, which edge region, in the assembled bearing, exerts the aforementioned biasing force, in such a way that under all load conditions for which the bearing is designed for use, each bearing roller is retained in contact with each of said confronting bearing surfaces.

2.- A roller bearing according to claim 1, wherein the body of material which defines at least one of said confronting bearing surfaces, or the bearing surface of a roller, is undercut at an edge region of that bearing surface thereby to provide between the undercut and bearing surface a deformable overhang region (18,28).

3.- A roller bearing according to any one of the claims 1 or 2, wherein a bearing ring (13) defines one of said confronting bearing surfaces and is provided with an undercut (17), said undercut being provided in that half of the

thickness of the ring which is adjacent the bearing surface of said ring.

4.- A roller bearing according to any one of the preceding claims, wherein each of the two edge regions of a bearing surface is provided with a deformable overhang.

5.- A roller bearing according to any one of the preceding claims, wherein at least one of the confronting bearing surfaces has associated therewith a deformable component (30,40) to serve as said biasing means.

6.- A roller bearing according to claim 5, wherein said deformable component (30) is deformable by virtue of the shape and flexibility of the component.

7.- A roller bearing according to claim 5 or claim 6, wherein the deformable component (40) is deformable by virtue of compressibility of the material of the component.

8.- A roller bearing according to any one of claims 5 to 7, wherein the deformable component is a biasing ring (30) positioned between the bearing surface (33) of one of said confronting bearing surfaces and an abutment surface (34) associated with said bearing surface.

9.- A roller bearing according to any one of claims 5 to 8, wherein the biasing means is a biasing ring (40) provided substantially centrally between end regions of a bearing surface.

10.- A roller bearing according to any one of the preceding claims and which is a radial type roller bearing.

11.- A roller bearing according to any one of the preceding claims, wherein the bearing rollers are cylindrical.

12.- A roller bearing according to any one of the claims 1 to 10, wherein the bearing rollers are taper type rollers.

13.- A multi-stage gear unit comprising a high speed and intermediate speed shaft wherein at least one of said shafts is supported by a roller bearing (10) according to any one of the preceding claims.